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Abstract

The aim of the present study is to develop computational models using nonlinear finite element method for the ultimate strength of steel stiffened plate structures which are subjected to either monotonic or cyclic compressive loadings. For monotonic compressive loading, the elastic-plastic large deflection analysis is undertaken taking into account the effects of geometric and material nonlinearities. For cyclic compressive loading, the loading path scenarios associated with cyclic loading are defined in advance and then the nonlinear responses are simulated until and after the ultimate strength is reached. The computational methods are verified by comparison with the test database which has been obtained from a large physical model testing. The cyclic loading paths applied for the computations are those recorded during the testing. Details of the computational models are documented.

Keywords: Steel stiffened plate structures; Monotinic compressive loading; Cyclic compressive loading; Ultimate strength; Nonlinear finite element method